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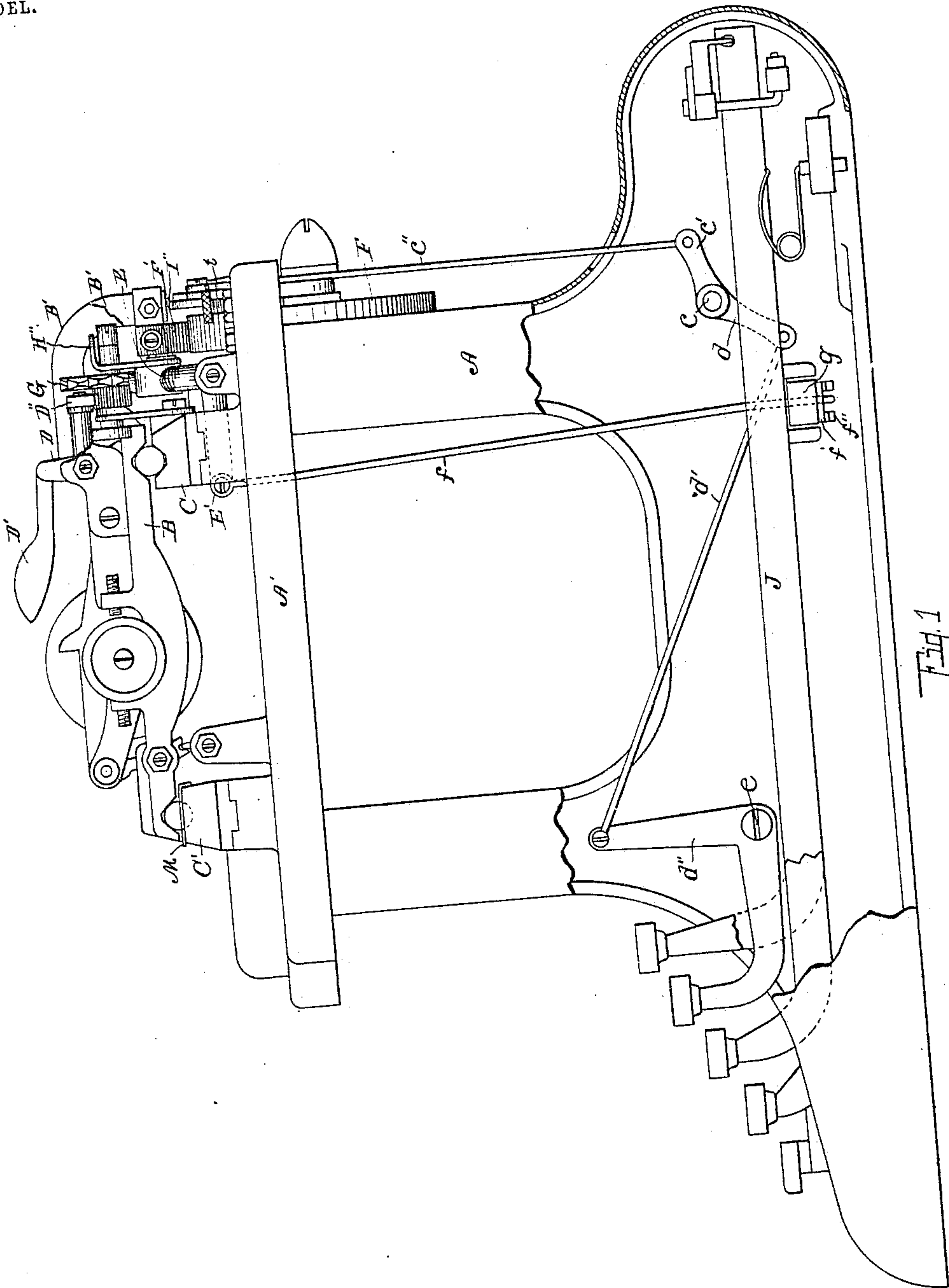
PATENTED NOV. 15, 1904.

W. R. FOX & G. J. BARRETT.
CARRIAGE FEED MECHANISM FOR TYPE WRITERS.

APPLICATION FILED JULY 31, 1902.

4 SHEETS—SHEET 1.

MODEL.



Witnesses:

Arthur A. Teller
Otto A. Earl

Inventors

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By Fred L. Chappell
Att'y.

No. 775,269.

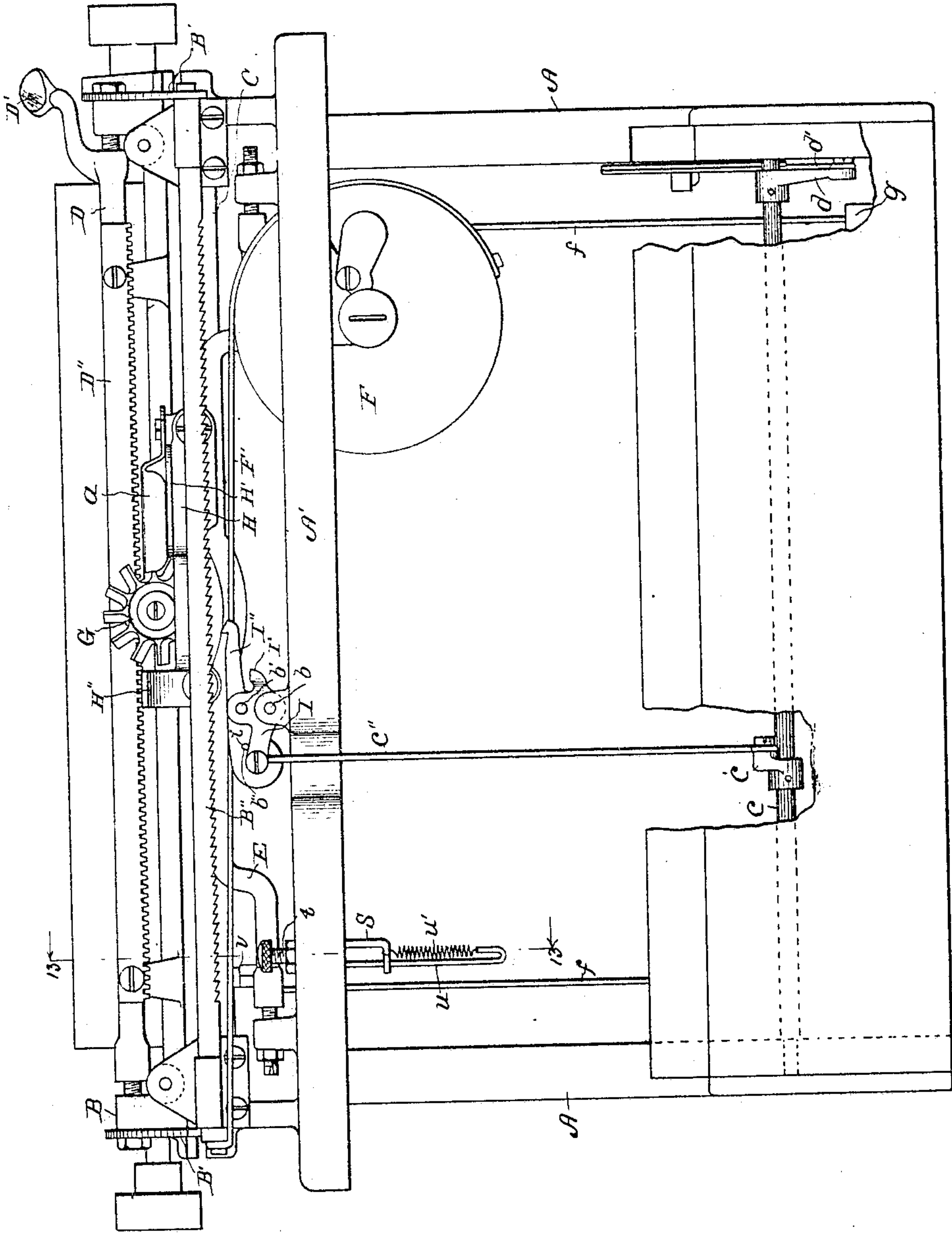
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4 SHEETS—SHEET 2.

NO MODEL.



7392

Witnesses:

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PATENTED NOV. 15, 1904.

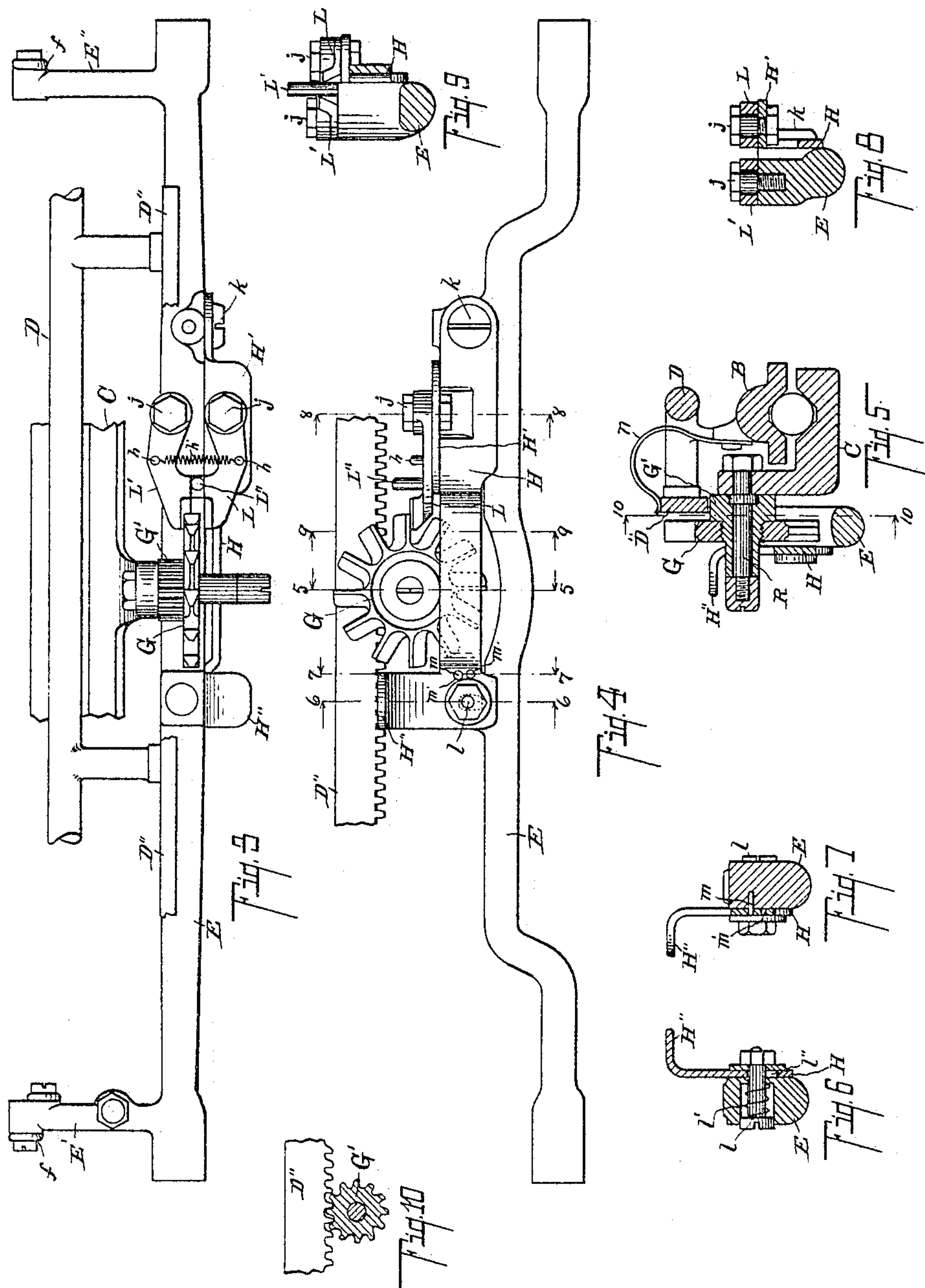
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NO MODEL.

4 SHEETS—SHEET 3.



Witnesses:

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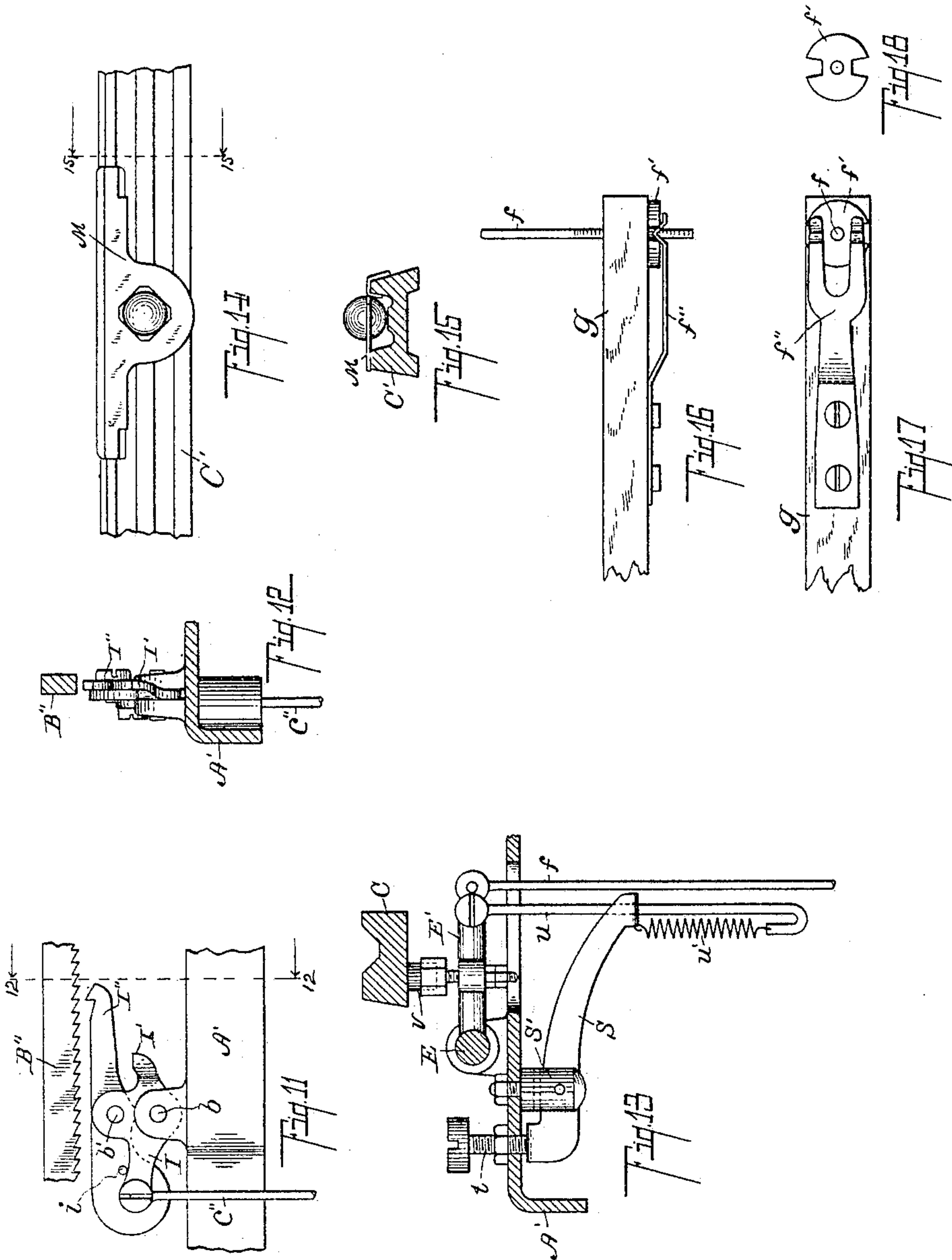
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NO MODEL.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

WILLIAM R. FOX AND GLENN J. BARRETT, OF GRAND RAPIDS, MICHIGAN,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO FOX TYPEWRITER COMPANY,
LIMITED, OF GRAND RAPIDS, MICHIGAN.

CARRIAGE-FEED MECHANISM FOR TYPE-WRITERS.

SPECIFICATION forming part of Letters Patent No. 775,269, dated November 15, 1904.

Application filed July 31, 1902. Serial No. 117,774. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM R. FOX and GLENN J. BARRETT, citizens of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Carriage-Feed Mechanism for Type-Writers, of which the following is a specification.

This invention relates to improvements in the carriage and feed mechanism of type-writing machines.

The objects of the invention are, first, to provide means which shall guide the carriage true, so that an accurate escapement means is possible; second, to provide an improved escapement means which shall be positive in its operation; third, to provide an escapement which is easily adjustable for speed; fourth, to provide an improved means of setting back the carriage step by step; fifth, to provide an improved tension means for use in connection with an escapement for the feed mechanism; sixth, to provide improved means of adjusting the actuating-bar of an escapement.

Further objects will definitely appear in the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of our invention is fully illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a detail side elevation view of a type-writing machine embodying our improved carriage and feed mechanism, the remaining parts of the machine being omitted, portions of the frame being broken away to show details of construction. Fig. 2 is a rear elevation view of the parts appearing in Fig. 1. Fig. 3 is an enlarged detail plan view of the escape-wheel and adjacent mechanism. Fig. 4 is a rear elevation view of the parts appearing in Fig. 3. Fig. 5 is a transverse detail sectional view of the escapement-wheel and adjacent parts, taken on line 5 5 of Fig.

4. Fig. 6 is a detail sectional view of the adjusting means for the dog, taken on line 6 6 of Fig. 4. Fig. 7 is a detail sectional view of the adjusting means for the dog, taken on line 7 7 of Fig. 4. Fig. 8 is a detail sectional view through the dog-pivots, taken on line 8 8 of Fig. 4. Fig. 9 is a detail sectional view on line 9 9 of Fig. 4, showing the relative position of the dogs when they are set for ordinary speed. Fig. 10 is a detail sectional view of the rack and pinion, taken on a line corresponding to line 10 10 of Fig. 5. Fig. 11 is an enlarged detail elevation view of the step-by-step return-pawl. Fig. 12 is a sectional view on line 12 12 of Fig. 11, showing details of the said pawl and connections. Fig. 13 is a detail sectional view on line 13 13 of Fig. 2, showing the details of construction of the key-tension device. Fig. 14 is a detail view of the front track-rail and ball-retainer. Fig. 15 is a sectional view on line 15 15 of Fig. 14. Fig. 16 is a detail view of the adjusting means for adjusting the connection from the escapement to the common bar beneath the key-levers. Fig. 17 is an inverted plan view of one end of the bar. Fig. 18 is a detail plan view of the notched nut constituting the part of this connection.

In the drawings all of the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawings, A is the main frame of the type-writer, and A' is the top plate of such frame which supports the carriage. The carriage B is carried on suitable ball-bearings.

A suitable way or ball-race is formed in the transverse bar C, consisting of a suitable V-shaped groove, and a corresponding groove is on the under side of the rear of the carriage. This serves always, owing to the V-shaped formation, to secure a smooth straight-running bearing for the carriage, which is of great importance with our improved feed mechanism. This guiding in a straight line is best accomplished by the single groove at the rear. At the front of the carriage and on

the under side we form a straight V-groove, which comes opposite a way for the ball on the front of the machine, which is formed with a flat horizontal central portion on which the ball bears, so that it can play back and forth, thus avoiding the necessity of compensating for uneven wear. Each side of the bottom of the track is hollowed away in parallel grooves to permit the ready crowding of dust and oil or grease from the path of the bearing-ball. The ball is retained in position by a sliding-plate M, conformed thereto and perforated at the center for the ball.

Back of the carriage B we provide a rack D'', which is carried on the rock-shaft D, pivoted to the back of the carriage, which rock-shaft is controlled by a finger-lever D', projecting therefrom toward the front of the machine. The teeth on this rack D'' are slightly inclined forward from the direction in which they are advanced.

A toothed escapement-wheel and a pinion G' are supported on a suitable shaft carried by the machine-frame at the rear. The pinion G' meshes with the rack D'', and its teeth are sloped slightly backward like ratchet-teeth to correspond to and engage with the teeth of the rack, they being oppositely inclined to the teeth of the rack, so that their square surfaces engage the square surfaces of the teeth of the rack as it is advanced.

The rack D'' is held normally in contact with the pinion G' by a spring n, and owing to the formation of the teeth there is no tendency to become disengaged when the pinion is acting upon the rack.

The escapement-wheel is formed with projecting teeth with radial flat surfaces for contacting with the dogs. The backs of the teeth are sloped on each side to substantially a knife-edge at the middle of the back, the objects of which will be apparent later on.

The method of attaching the escapement-wheel to the frame is illustrated in Fig. 5. The escapement-wheel is secured by a thread to the sleeve carrying the pinion G', whereby the two are brought into very close proximity, the two revolving together on the journal R.

E is a rock-shaft supported at the back of the machine, the same being curved upwardly at its central portion and carrying dogs L L', which engage the escapement-wheel G. The inner dog L' is carried on a pivot j, which enters into the raised part of the shaft E, and the outer dog L is pivoted at j to a lever H', which is pivoted at k, and is adjustable up and down and held adjustably on the shaft E by means of the pin m entering one of the series of holes m' for adjustment of this lever H'.

A thumb-piece H'' is turned out to the rear of the machine to permit of its manipulation. The pin m is controlled by a spring l' on the short bolt l, which permits the pin to be withdrawn and holds it in place by spring-pressure when it is adjusted. (See Figs. 6 and 7.)

The object of adjusting the outer dog L is to control the feed of the machine to make it either slow or fast. When the outer pawl L is set slightly in advance and the machine is operated, the inner pawl L' will be in contact with one of the teeth of the escapement-wheel, and as soon as the key is depressed it will be drawn out of engagement and the outer dog will be carried forward to engage the next tooth, permitting thereby the advance of the carriage as the key is being depressed. When the pressure is removed from the key, of course the rock-shaft swings back, carrying the inner pawl L' underneath the tooth, and as the movement is continued the rear dog L will be withdrawn, permitting a slight advance, so that the structure is ready for the next stroke of the key. Thus the escapement is set as a speed escapement.

A pin L'' is on the shaft E between the dogs L L' to limit their movement and retain them in proper relation to the escapement-wheel. A coiled spring h' connects the pawls L L' together by embracing pins h h' thereon, holding them both normally against the stop-pin L'' so that the said pawls are normally in position for coaction with the escapement-wheel G'.

When it is desired to have the escapement operate slowly, as for a beginner, the outer dog L is lowered so that it comes below the inner dog L'. Under these circumstances the operation of the machine is different, because on the depression of a key the inner dog is withdrawn from under the tooth, which tooth drops a very short distance onto the outer dog, when the continued pressure of the key throws the type against the platen with the carriage in a stationary position. When the key is raised, the inner dog strikes on the sloping front side of the tooth and permits the motion of the escapement, thereby making it possible for the beginner, who depresses the keys very slowly, to properly print on the machine.

We put tension on our improved escapement by means of the structure appearing in Figs. 2 and 13. A rod u is secured by a suitable pivotal connection to one of the arms E' of the rock-shaft E and extends downward therefrom. A lever S is pivoted into the bracket S' on the under part of the top A' and is acted upon at the short end by a thumb-screw t for adjusting the same. An extension coiled-spring u' connects the inner end of the lever S to the rod u, and by adjusting the thumb-screw its tension is controlled and varied to secure the proper and best adjustment for the escapement. The escapement is adjusted by a set-screw on the arm of the lever E', which carries a rubber buffer v on its top, which strikes against the under side of the track c. It is adjustable to control the relative position of the escapement-dogs on the shaft E.

The arms E' and E'' of the rock-shaft extend toward the front of the machine and have piv-

otally connected thereto rods f , which extend down below the key-levers J, through a transverse common bar g beneath the same, and the length of this rod f is adjusted by a screw-nut f'' on the lower end, controlled by a bifurcated spring f''' , having projections to engage the notches of the nut, whereby the adjustment can be varied by half-turns of the nut and the same be locked securely against any possible displacement.

With our improved feed mechanism we have provided a means for controlling the carriage and means for moving the carriage back step by step, which consists of the ratchet-toothed rack B'', secured rigidly to the main carriage and extending along the back of the same. Beneath this rack we support a specially-constructed pawl I'', adapted to engage the same. This pawl is pivoted to a lever I, and is weighted to hold it yielding in position. A stop-pin i is on the pawl I'', by which it is supported normally out of contact with the toothed bar B''. The lever I is pivoted at h and is provided with a finger I', which will engage the pawl when the lever is operated to the limit of its stroke. A rod c'' extends downwardly from the lever I and is connected to an arm c' on the rock-shaft e . This rock-shaft is operated from a key-lever by means of a connection d'' to an arm d' on the rock-shaft e . When for any reason it is desired to set the carriage back one step, the lever d'' is operated from the keyboard, which pulls down the rod c'' , which acts on the lever I, this first permitting the pawl I'' to engage the rack B'', when a continued movement swings the pawl to carry the carriage backward one step, the projection I' of the lever contacting with the back of the pawl to stop the same when the carriage has been moved back one step. This avoids the necessity of carefully moving the carriage by hand when it is a space too far, and it can be readily moved back two or three steps to set it right by manipulation of this key.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination of the frame of the machine; the platen-carriage B adapted to reciprocate thereon, supported by suitable ball-bearings; a rack D'' supported on pivotal arms to the rear of said carriage; means for raising said rack; a toothed escapement-wheel supported on a suitable shaft R to the rear of the machine, the teeth of which are square on their face and beveled off at each side on their backs; a pinion G' carried by the shaft R of the escapement-wheel, the teeth of which engage the teeth of the rack D''; a rock-shaft E supported to the rear of said machine and bent upwardly at its middle portion; a pair of dogs L, L', for alternately engaging the teeth of the escapement-wheel, one of which is mount-

ed on a vertical pivot j on the shaft E, and the other of which is mounted on the vertical pivot j on the adjustable lever H; the adjustable lever H pivoted on the horizontal pivot k and provided with a series of holes, a pin m on the side of the rock-shaft E for engaging a series of holes; a spring l' on the bolt l for holding the lever H in a locked position, whereby the outer dog L can be adjusted to a position in advance or in the rear of the inner dog L'; a vertical pin L'' on the rock-shaft E extending up between the dogs and in line with the escapement-wheel; and a spring h' connected to pins h , h , on the dogs L, L', holding the dogs, L, L', normally toward each other in position to act upon the escapement-wheel G; a common bar g beneath the key-levers J; rod connections f therefrom to a lever E' on the rock-shaft E; an adjustable nut f'' on the lower end of the rod f being provided with oppositely-situated notches; and a forked spring f''' on the bar g to engage said notches and retain the coupling in position, all coacting substantially as described and for the purpose specified.

2. In a type-writing machine, the combination of the frame of the machine; the platen-carriage B adapted to reciprocate thereon; a rack D'' supported on pivotal arms to the rear of said carriage; means for raising said rack; a toothed escapement-wheel supported on a suitable shaft R to the rear of the machine, the teeth of which are square on their face and beveled off at each side on their backs; a pinion G' carried by the shaft R of the escapement-wheel, the teeth of which engage the teeth of the rack D''; a rock-shaft E supported to the rear of said machine and bent upwardly at its middle portion; a pair of dogs L, L', for alternately engaging the teeth of the escapement-wheel, one of which is mounted on a vertical pivot j on the shaft E, and the other of which is mounted on the vertical pivot j on the adjustable lever H; the adjustable lever H pivoted on the horizontal pivot k and provided with a series of holes, a pin m on the side of the rock-shaft E for engaging said series of holes; a spring l' on the bolt l for holding the lever H in a locked position, whereby the outer dog L can be adjusted to a position in advance or in the rear of the inner dog L'; a vertical pin L'' on the rock-shaft E extending up between the dogs and in line with the escapement-wheel; and a spring h' connected to pins h , h , on the dogs L, L', holding the dogs L, L', normally toward each other in position to act upon the escapement-wheel G; a common bar g beneath the key-levers J; rod connections f therefrom to a lever E' on the rock-shaft E, all coacting substantially as described and for the purpose specified.

3. In a type-writing machine, the combination of the frame of the machine; the platen-carriage B adapted to reciprocate thereon; a

rack D'' supported on pivotal arms to the rear of said carriage; means for raising said rack; a toothed escapement-wheel supported on a suitable shaft R to the rear of the machine, the teeth of which are square on their face and beveled off at each side on their backs; a pinion G' carried by the shaft R of the escapement-wheel, the teeth of which engage the teeth of the rack D''; a rock-shaft E supported to the rear of said machine and bent upwardly at its middle portion; a pair of dogs L, L' for alternately engaging the teeth of the escapement-wheel, one of which is mounted on a vertical pivot *j* on the shaft E, and the other of which is mounted on the vertical pivot *j* on the adjustable lever H; the adjustable lever H pivoted on the horizontal pivot *k* and provided with a series of holes, a pin *m* on the side of the rock-shaft E, for engaging said series of holes; a spring *l* on the bolt *l* for holding the lever H in a locked position, whereby the outer dog L can be adjusted to a position in advance or in the rear of the inner dog L'; a common bar *g* beneath the key-levers J; rod connections *f* therefrom to a lever E' on the rock-shaft E, all coacting substantially as described and for the purpose specified.

4. In a type-writing machine, the combination of the frame of the machine; the platen-carriage B adapted to reciprocate thereon; a rack D'' supported on pivotal arms to the rear of said carriage; means for raising said rack; a toothed escapement-wheel supported on a suitable shaft R to the rear of the machine, the teeth of which are square on their face and beveled off at each side on their backs; a pinion G' carried by the shaft R of the escapement-wheel, the teeth of which engage the teeth of the rack D''; a rock-shaft E supported to the rear of said machine and bent upwardly at its middle portion; a pair of dogs L L' for alternately engaging the teeth of the escapement-wheel, one of which is mounted on a vertical pivot *j* on the shaft E, and the other of which is mounted on the vertical pivot *j* on the adjustable lever H; the adjustable lever H provided with a series of holes and carried by the rock-shaft E on the horizontal pivot *k*; a pin *m* on the side of said rock-shaft E for engaging the said series of holes to retain the lever H adjustably in position; a common bar *g* beneath the key-levers J; rod connections *f* therefrom to a lever E' on the rock-shaft E, all coacting substantially as described and for the purpose specified.

5. In a type-writing machine, the combination of the frame of the machine; the platen-carriage B adapted to reciprocate thereon; a rack D'' supported on pivotal arms to the rear of said carriage; means for raising said rack; a toothed escapement-wheel supported on a suitable shaft R to the rear of the machine, the teeth of which are square on their face

and beveled off at each side on their backs; a pinion G' carried by the shaft R of the escapement-wheel, the teeth of which engage the teeth of the rack D''; a rock-shaft E supported to the rear of said machine and bent upwardly at its middle portion; a pair of dogs L, L' for alternately engaging the teeth of the escapement-wheel, one of which is mounted on a vertical pivot *j* on the shaft E, and the other of which is mounted on the vertical pivot *j* on the adjustable lever H; the adjustable lever H pivoted on the horizontal pivot *k*; a common bar *g* beneath the key-levers J; rod connections F therefrom to a lever E' on the rock-shaft E, all coacting substantially as described and for the purpose specified.

6. In an escapement for a type-writer, an escapement-wheel connected to control the movements of the carriage, having teeth that are square-faced at the front and beveled at each side at the back; a pair of dogs one to each side of said wheel, one of which is adjustable to a position in advance of or to the rear of the other; a stop for the dogs to hold them normally in line with the escapement-wheel; spring to hold the dogs normally toward each other; connections to the key-levers of the machine to rock the dogs, coacting for the purpose specified.

7. In an escapement for a type-writer, an escapement-wheel connected to control the movements of the carriage, having teeth that are square-faced at the front and beveled at each side at the back; a pair of dogs, one to each side of said wheel, one of which is adjustable to a position in advance of or to the rear of the other; a stop for the dogs to hold them normally in line with the escapement-wheel; spring to hold the dogs normally toward the stop; connections to the key-levers of the machine to rock the dogs, coacting for the purpose specified.

8. In an escapement for a type-writer, an escapement-wheel connected to control the movements of the carriage having teeth that are square-faced at the front and beveled at each side at their backs; a pair of dogs, one to each side of said wheel, adjusted, the one a little in advance of the other; tension devices for holding said dogs normally toward each other yieldingly in position, the said dogs being held normally nearer together than the thickness of the escapement-wheel; a stop means for said dogs whereby, when the dogs and their support are rocked, they will be alternately carried out of engagement with the teeth of the escapement-wheel, for the purpose specified.

9. In a type-writing machine, the combination of an escapement-wheel; a pair of dogs to alternately engage the same supported on independent pivots at right angles to the axle of the escapement-wheel, the pivot of one of which is on an adjustable support to vary its position in relation to the opposite dog by

setting it ahead or to the rear thereof, for the purpose specified.

10. In a type-writing machine, the combination of an escapement-wheel; a pair of dogs to alternately engage the same supported on independent pivots, the pivot of one of which is on an adjustable support to vary its position in relation to the opposite dog by setting it ahead or to the rear thereof, for the purpose specified.

11. In a type-writing machine, the combination of an escapement-wheel; a pair of dogs to alternately engage the same supported on independent pivots; an adjustable support for one of said pivots consisting of a lever having a spring part, the free end of which is adjustable by a pin on the main support entering a series of holes in said spring part.

12. In a type-writing machine, the combination with the frame of the machine; a carriage therefor; an escapement-wheel connected to control the movements of the carriage; a rock-shaft with upwardly-offset part supported on the top of the said machine and extending into close proximity to the escapement-wheel; horizontally-arranged escapement-dogs pivoted to the said upwardly-offset part of the rock-shaft on vertical pivots; connections from the key-levers to the rock-shaft for actuating the same, for the purpose specified.

13. In a type-writing machine, the combination with the frame of the machine, a carriage therefor; an escapement-wheel connected to control the movements of the carriage; a rock-shaft with upwardly-offset part supported on the top of the said machine and extending into close proximity to the escapement-wheel; escapement-dogs pivoted to the said upwardly-offset part of the rock-shaft on vertical pivots; connections from the key-levers to the rock-shaft for actuating the same, for the purpose specified.

14. In a type-writing machine, the combination with the frame of the machine; a carriage therefor; an escapement-wheel with pinion in close proximity thereto on the same shaft, connected to control the movements of the carriage; a rock-shaft with upwardly-offset part supported on the top of the said machine and extending into close proximity to the escapement-wheel; escapement-dogs pivoted on vertical pivots to the said upwardly-offset part of the rock-shaft; connections from the key-lever to the rock-shaft for actuating the same, for the purpose specified.

15. In a type-writing machine, the combination with the frame of the machine; a carriage therefor; an escapement-wheel connected to control the movements of the carriage; a rock-shaft pivoted to the top of the frame at a point to one side of the plane of the escapement-wheel with upwardly-offset part supported on the top of the said machine and extending into close proximity to the escapement-wheel, horizontally-arranged escapement-dogs pivoted on

vertical pivots to the said upwardly-offset part of the rock-shaft; connections from key-levers to the rock-shaft for actuating the same, for the purpose specified.

16. In a type-writing machine, the combination of an escapement; a rocker-shaft therefor, actuating the dogs; a projecting arm therefrom; a rod *u* connected to said arm; a lever *S* supported on the frame of the machine; a spring *u'*, connecting the long end of said lever to the rod for applying tension-pressure to the escapement mechanism; an adjusting-screw *t* through the frame contacting with the short end of the lever, for controlling the position of said lever, all coacting substantially as described and for the purpose specified.

17. In a feed mechanism, for type-writer carriages, the combination of the frame; a carriage adapted to reciprocate thereon; an escapement to permit the advance of said carriage; a rack; a lever *I* pivoted to the frame of the said machine; a counterbalanced pawl *I''* carried by the said lever positioned normally just out of engagement of said rack and adapted to swing into engagement with the same; a counterbalance for the pawl; a stop to limit the movement of the lever so that when the rack is engaged, the carriage will be returned one step; suitable connections from the lever to a key-lever of the machine, coacting for the purpose specified.

18. In a feed mechanism for type-writer carriages, the combination of the frame; a carriage adapted to reciprocate thereon; an escapement to permit the advance of said carriage; a lever *I*; a pawl *I''* carried by the said lever positioned normally just out of engagement of said rack and adapted to swing into engagement with the same; a counterbalance for the pawl; a stop to limit the movement of the lever so that when the rack is engaged, the carriage will be returned one step; suitable connections from the lever to a key-lever of the machine, coacting for the purpose specified.

19. In a feed mechanism for type-writer carriages, the combination with the escapement for permitting the advance of the carriage of an auxiliary rack secured to the carriage, having teeth corresponding to the teeth of the main rack of the escapement; a pivoted lever supported on the rear of the frame of the carriage with connections therefrom to a key on the keyboard of the machine; a pawl *I''* carried by the said lever, positioned to swing into contact with the said auxiliary rack; a stop *i* on the lever to contact with the pawl and hold the same normally out of position; and a stop *I'* on said lever to contact with the pawl and serve to limit its movement to a single space when it engages the auxiliary rack, all coacting for the purpose specified.

20. In a carriage-feed mechanism for a type-writer, the combination of an escapement hav-

ing a rocker-frame and dogs; a rod connected to said rocker-frame and threaded at its lower end; a universal bar beneath the key-levers; a nut on the lower end of said bar having
5 notches therein; a spring on the bar with projections to engage said notched nut to lock the same in an adjusted position, for the purposes specified.

10 21. In a type-writing machine, the combination of an escapement-wheel; a rock-shaft offset upwardly in a vertical plane; yielding dogs on said rock-shaft; supporting-pivots for said dogs disposed at right angles to the top of the machine.

15 22. In a type-writing machine, the combination with the frame of a journal supported

thereon; a sleeve with a pinion at one end; a toothed escapement-wheel secured on the sleeve in juxtaposition to the said pinion; a rack carried by the carriage and engaging the
20 said pinion; horizontally-arranged dogs beneath said rack to engage the toothed escapement-wheel.

In witness whereof we have hereunto set our hands and seals in the presence of two wit-
25 nesses.

WILLIAM R. FOX. [L. S.]
GLENN J. BARRETT. [L. S.]

Witnesses:

EDWARD G. MATTER,
G. K. McMULLEN.